REMARKS

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing Amendment, claims 1-5, 7-14 and 17-23 are pending in the application, with claims 1, 22 and 23 being the independent claims.

Interview

Applicants thank the Examiner for the telephonic interview conducted on September 12, 2005. No agreement was reached.

Rejections under 35 U.S.C. § 101

In the Action on pages 2-3, claims 1-5, 7-14, and 17-23 are rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. Claim 1 is amended to clarify that the claimed invention is a computer implemented system. Claims 22 and 23 were previously amended to clarify that the claimed methods were computer implemented. Applicants respectfully submit that claims 1, 22 and 23 are directed toward statutory subject matter and request that the rejection be withdrawn.

Rejections under 35 U.S.C. § 103

I. In the Action at pages 3-12, claims 1-5, 7-10, 12, 14 and 18-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,701,400 to Amado (hereinafter "Amado") in view of U.S. Patent No. 6,671,818 to Mikurak (hereinafter "Mikurak"), in further view of "Dempster-Shafer Reasoning for Medical Image Recognition, IEEE Computer Society (U.S.), Volume-Conference 3, Los Alamitos, CA, November 1991, pages 480-487 to Lin et al. ("Lin"), in further view of "Consensus in a multi-expert system" to Ng et al. ("Ng"), and in further view of "Interpretation of underwater scene data acquired by a 3-D acoustic camera" to De Natale et al (hereinafter "De Natale"). Applicants respectfully traverse the rejection.

As amended, claim 1 recites a computer-implemented system operative to recognize objects in content comprising: a blackboard comprising ***a plurality of experts*** adapted to process data on a computer, and said data comprising original input data and/or data created by processing of any of said plurality of experts, and ***a controller operative to control said experts***; a ***belief model***, coupled to said controller, comprising a set of beliefs and probabilities associated with each belief of said set of beliefs, wherein said belief model comprises a set of rules deduced from a computer-implemented learning system, said learning system comprising truth data files for ***deducing*** said set of beliefs, probabilities and ***shadow objects***, a learning system controller and a statistics space controlled by said learning system controller, wherein said set of rules describes how different classes recognized by said learning system are related to each other spatially and physically; a belief network, coupled to said controller; and ***a relations subsystem, coupled to said controller***.

The Action states that Amado fails to teach a belief model, coupled to said controller, comprising a set of beliefs and probabilities associated with each belief of said set of beliefs, wherein said belief model comprises a set of rules deduced from a learning system, said learning system comprising truth data files for deducing said set of beliefs, probabilities and shadow objects, a learning system controller and a statistics space controlled by said learning system controller, wherein said set of rules describes how different classes recognized by said learning system are related to each other spatially and physically; a belief network, coupled to said controller. In addition to not teaching this element of claim 1, Amado fails to teach at least two other features of claim 1.

First, Amado fails to teach a blackboard comprising a **controller operative to control the experts**. Amado relates to an executive information system (EIS) including decision support system softare and expert systems. The controller in col. 77 of Amado cited in the Action is not a controller operative to control the experts and is not part of a blackboard. Instead, the "controller" of Amado acts to control various commercial products to act as a user interface or to modify the user interface for displaying results or program options. See Amado, col. 77, ll. 2057. In contrast, the controller of claim 1 coordinates which expert contributes to a problem-solving exercise. For example, a controller may be made up of code that takes care of choosing which experts are to be executed, and of scheduling and executing those experts. It may also perform the chores of

gathering the input data for the experts, placing the output of the experts on the appropriate object class *blackboards*, keeping the belief network up to date, and of checking for duplicate objects. The controller may make extensive use of the belief model to make decisions governing which experts can be run and when to run them. See specification, p. 17, ll. 4-9. Therefore, Amado does not teach or disclose a controller operative to control the experts.

Second, Amado does not teach or discuss a **relations subsystem coupled to the controller**. Instead, the portion of Amado cited by the reference teaches maintaining algorithms, and relationships among files and database fields, even if weighting factors change in order to preserve the preferred embodiment. Amado, col. 96, ll. 52-61. There is no discussion of a relations subsystem coupled to a controller. In contrast, the spatial relation subsystem of claim 1 may be responsible for determining how different objects returned by the experts are related to each other. Each time a new object is instantiated in one of the object class blackboards, the belief model can be used to determine with which other object classes it may have significant spatial relations and what those relations might be. It is also possible to add new relations to the spatial relation subsystem. See specification, p. 11, l. 24- p. 12, l. 9. Therefore, Amado does not teach or disclose a relations subsystem coupled to the controller.

Further, Mikurak fails to overcome the deficiencies of Amado. The Action asserts that Mikurak teaches a controller in col. 51, lines 13-20. However, claims 1 recites "a blackboard comprising...a controller operative to control the plurality of experts." The controller discussed in this portion of Mikurak is a generic term referring to the ability of a computer program to enable a computer processor to perform functions. There is no teaching or suggestion in Mikurak of a blackboard comprising the controller, or of the controller controlling a plurality of experts. Therefore, Mikurak fails to teach a blackboard comprising...a controller operative to control the plurality of experts.

Even if Mikurak did teach a blackboard comprising...a controller operative to control the plurality of experts, Mikurak fails to teach a learning system comprising truth data files for deducing said set of beliefs, said probabilities and shadow objects. Mikurak is directed to a system and method of life cycle network asset management and has no discussion of a learning system or

the deduction of shadow objects. Therefore, Mikurak, alone or in combination, fails to teach the elements of claim 1.

Further, Lin fails to overcome the deficiencies of Amado. As stated previously in Applicant's Appeal Brief, and in the Response of April 13, 2005, Applicants respectfully note that Lin fails to teach or suggest at least three elements of claim 1.

In particular, Lin fails to teach a learning system comprising truth data files for deducing said set of beliefs, said probabilities and shadow objects. Shadow objects provide a method of identifying objects that do not have specific recognition experts. See, e.g., page 11, lines 10-13. Instead, Lin teaches a system that can recognize only a **finite** number of **known** element types, i.e. body parts, such as, e.g. a liver or a lung. See Lin p. 482, section 4, 1st paragraph. There is no discussion in Lin of how its system may deal with an unknown object. In contrast, the truth data files of Applicants' invention can allow the system to learn to recognize new, unknown objects by deducing a set of beliefs, probabilities and shadow objects. A truth data file can contain, for example, for each object identified in the image: the object's class id, its bounding box's position and size, and a flag to indicate whether or not the object is a shadow object. See, e.g., page 27, lines 19-21. Therefore, Lin fails to teach a learning system comprising truth data files for deducing the set of beliefs, probabilities and shadow objects.

Further, Ng, alone or in combination, fails to overcome the deficiencies of Amado, Mikurak, and Lin. As stated previously in Applicant's Response of April 13, 2005, Ng fails to teach at least two limitations of claim 1.

In particular, Ng does not teach a learning system comprising **truth data files for deducing said set of beliefs**, probabilities and **shadow objects**. The discussion in Ng is directed more toward whether a multiple knowledge-base system (MKBS) is possible and how to achieve consensus among the expert systems that make up an MKBS. There is no mention of a belief model, or any specifics about any existing embodiments. To the extent that beliefs and probabilities are discussed, the discussion is focused on the construction of a confidence matrix. See, Ng, section 4.1. Ng does not discuss deducing rules from a learning system, deducing beliefs and shadow objects from a

learning system, or rules that describe how recognized classes are related to each other spatially and physically.

Further, De Natale, alone or in combination, fails to overcome the deficiencies of Amado, Mikurak, Lin, and Ng. The Action asserts that De Natale teaches a system deducing shadow objects. However, De Natale fails to teach a learning system comprising truth data files for deducing ...shadow objects.

De Natale teaches a system that uses an array of sensors or detectors to identify characteristics of underwater objects. The characteristics identified by the detectors are used to build a hypothesis tree in an attempt to identify the object. The nodes in the tree are instantiated based on the probabilistic similarity between the characteristic identified and a model **predefined** by the user. De Natale, II-487, left column, third and fourth full paragraphs. The "deduction" reference in De Natale cited in the Action is the deduction of the area in which to search for a sub-part of the predefined model. De Natale does not disclose the ability to deduce a shadow object. There is no teaching in De Natale of how its system would behave if it encountered an object for which no predefined model existed.

The Action asserts that it would have been obvious to modify Amado with Mikurak to provide a secure means for charging users based on information and/or resources actually used; with Lin to avoid exhaustive enumeration of evidence combination; with Ng to improve system performance; and with DeNatale to process and interpret underwater images. Applicants respectfully disagree.

None of the cited references teach or suggest the deduction of shadow objects, nor does the combination of any or all of the references teach or suggest the deduction of shadow objects. The Action improperly combines the applied references. The Amado reference is directed to a system that provides decision support business related executive information system financial data, where the data is analyzed according to a set of rules and presented to the executive. Mikurak is directed to a system and method of life cycle network asset management. Lin is directed to a system for recognizing predetermined components of a medical image. Ng is directed to a multiple knowledge

base system. De Natale is directed to interpretation of underwater scenes with the use of predefined models. Each of the applied references comes from a different field of endeavor, and the problems that each seeks to solve are not the same. Applicants respectfully note that the Action improperly uses Applicants' specification in hindsight to allegedly obtain a combination of the five references. Amado does not process image data, has no ability to infer objects or relationships for which it has not been programmed, and none of the systems in any of Amado, Mikurak, Lin, Ng or De Natale are able to learn to recognize objects for which they are not specifically programmed. Therefore, one skilled in the art of the present invention would not have been motivated to seek out a reference pertaining to life cycle network asset management, a reference pertaining to recognizing predetermined components of a medical image, a references pertaining to a multiple knowledge base system, and a reference pertaining to interpretation of underwater scenes with the use of predefined models to create the invention in claim 1 from a reference pertaining to analysis of financial and business data for decision support, executive information system applications.

Therefore, because none of the references, alone or in combination, teach or suggest all of the elements of claim 1, and further because one skilled in the art would not have motivated to combine the references, the Action has failed to present a prima facie case of obviousness for claim 1. Claim 1 is therefore allowable, and Applicants respectfully request that the rejection be withdrawn.

Claims 2-5, 7-10, 12, 14 and 18-21 depend from Claim 1 and are allowable as being dependent from an allowable claim.

Claim 22 recites elements similar to those recited in claim 1, and is allowable for at least the reasons given above with respect to claim 1.

II. In the Action at pages 12-15, claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Amado in view of Mikurak, in view of Lin, in view of DeNatale and in further view of "Special Issue on Spatial Database Systems: Qualitative Representation of Spatial Knowledge in Two-Dimensional Space" by Papadias et al ("Papadias"). Applicants respectfully traverse the rejection.

Claim 11 is dependent on claim 1, and is allowable as being dependent from an allowable claim. Further, Papadias fails to overcome the deficiencies of the combination of Amado, Mikurak, and Lin. While Papadias discloses concepts of spatial relationships, it does not disclose a blackboard comprised of a plurality of experts. Papadias also does not disclose a controller, a belief model, or a relations subsystem as recited in claim 1. Therefore, the combination of Papadias with Amado and Lin does not teach, disclose, suggest or render obvious the elements of claim 11. Claim 11 is therefore allowable, and Applicants respectfully request that the rejection be withdrawn.

III. In the Action at pages 15-19, claims 12-13 are rejected 35 U.S.C. § 103(a) as being unpatentable over Amado in view of Mikurak, in view of Lin, in view of Ng and in further view of "Logical design for temporal databases with multiple granularities" to Wang et al. ("Wang"). Applicants respectfully traverse the rejection.

Claims 12 and 13 are dependent on claim 1, and are allowable as being dependent from an allowable claim. Further, Wang fails to overcome the deficiencies of the combination of Amado, Mikurak, Lin and Ng. Wang discusses ways to implement temporal relationships among data stored in a database. Wang does not disclose any features of a blackboard system comprising a plurality of experts, or a controller operative to control the experts. Wang also does not disclose a belief model as recited in claim 1. Therefore, the combination of Wang with Amado, Mikurak, Lin, and Ng does not teach, disclose, suggest or render obvious the elements of claims 12 or 13. Claims 12-13 are therefore allowable, and Applicants respectfully request that the rejection be withdrawn.

IV. In the Action at pages 19-22, claim 17 is rejected 35 U.S.C. § 103(a) as being unpatentable over Amado in view of Mikurak, in view of Lin, in view of Ng, in view of De Natale, and in further view of U.S. Patent No. 5,974,549 to Golan ("Golan"). Applicants respectfully traverse the rejection.

Claim 17 is dependent on claim 1, and is allowable as being dependent from an allowable claim. Further, Golan fails to overcome the deficiencies of the combination of Amado, Mikurak, Lin, and Ng. Golan discloses a method for allowing downloaded software components to execute securely on a computer. While Golan mentions stub functions in the context of intercepting

software code calls to subroutines not in a provided application program interface, the use of stub functions in Golan has nothing to do with the process of integrating a new expert into an existing blackboard system comprised of a plurality of experts. Golan also does not disclose a controller, a belief model, or a relations subsystem as recited in claim 1. Therefore, the combination of Golan with Amado, Lin, and Ng does not teach, disclose, suggest or render obvious the elements of claim 17. Claim 17 is therefore allowable, and Applicants respectfully request that the rejection be withdrawn.

V. In the Action at pages 22-24, claim 23 is rejected 35 U.S.C. § 103(a) as being unpatentable over Amado in view of Mikurak, in view of Golan, in view of Lin and in further view of De Natale. Applicants respectfully traverse the rejection.

Claim 23 recites some elements similar to those recited in claims 1 and 22. As discussed above regarding claims 1 and 22, Amado, Mikurak and Lin fail to teach at least **updating a belief model**. Further, none of Amado, Mikurak, Lin or Golan teach or disclose **adding a stub function to a blackboard**.

As described in Applicant's Appeal Brief, Lin in particular fails to teach (1) an ***expert***; (2) a learning system comprising **truth data files for deducing** beliefs, probabilities and **shadow objects**; (3) **deducing** a set of rules from said learning system; (4) **determining if the output** of [a new] expert **is new**; and (5) **adding the new output's class to said blackboard**.
Golan, as discussed above, uses stub functions, but does not teach adding a stub function to a blackboard. Golan does not teach or disclose a blackboard or any type of expert system. Therefore, the combination of Golan with Amado, Mikurak and Lin does not teach, disclose, suggest or render obvious the elements of claim 23. Claim 23 is therefore allowable, and Applicants respectfully request that the rejection be withdrawn.

Other Matters

The Action on pages 34-35 states that the declaration is defective. Applicants' representative will file a supplemental declaration once it receives the signatures of the Applicants.

The Action on pages 35-36 objects to the listing of references in the specification as not being a proper IDS. Applicants concurrently submit an IDS listing the references listed in the specification. Applicants request consideration of these references and withdrawal of the objection.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

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Respectfully submitted,

By _____

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